George Haller

List of Publications by Year
in descending order

132 papers	8,868 citations	66315 42 h-index	42364 92 g-index
139 all docs	139 docs citations	139 times ranked	3594 citing authors

#	Article	IF	Citations
1	An objective definition of a vortex. Journal of Fluid Mechanics, 2005, 525, 1-26.	1.4	753
2	Lagrangian Coherent Structures. Annual Review of Fluid Mechanics, 2015, 47, 137-162.	10.8	751
3	Lagrangian coherent structures and mixing in two-dimensional turbulence. Physica D: Nonlinear Phenomena, 2000, 147, 352-370.	1.3	717
4	Distinguished material surfaces and coherent structures in three-dimensional fluid flows. Physica D: Nonlinear Phenomena, 2001, 149, 248-277.	1.3	691
5	A variational theory of hyperbolic Lagrangian Coherent Structures. Physica D: Nonlinear Phenomena, 2011, 240, 574-598.	1.3	335
6	Detection of Lagrangian coherent structures in three-dimensional turbulence. Journal of Fluid Mechanics, 2007, 572, 111-120.	1.4	289
7	Defining coherent vortices objectively from theÂvorticity. Journal of Fluid Mechanics, 2016, 795, 136-173.	1.4	238
8	Finite time transport in aperiodic flows. Physica D: Nonlinear Phenomena, 1998, 119, 352-380.	1.3	191
9	Experimental Measurements of Stretching Fields in Fluid Mixing. Physical Review Letters, 2002, 88, 254501.	2.9	181
10	Uncovering the Lagrangian Skeleton of Turbulence. Physical Review Letters, 2007, 98, 144502.	2.9	176
11	Geodesic theory of transport barriers in two-dimensional flows. Physica D: Nonlinear Phenomena, 2012, 241, 1680-1702.	1.3	157
12	Computing Lagrangian coherent structures from their variational theory. Chaos, 2012, 22, 013128.	1.0	151
13	Lagrangian coherent structures: The hidden skeleton of fluid flows. Physics Today, 2013, 66, 41-47.	0.3	150
14	Pollution release tied to invariant manifolds: A case study for the coast of Florida. Physica D: Nonlinear Phenomena, 2005, 210, 1-20.	1.3	146
15	A critical comparison of Lagrangian methods for coherent structure detection. Chaos, 2017, 27, 053104.	1.0	142
16	Nonlinear normal modes and spectral submanifolds: existence, uniqueness and use in model reduction. Nonlinear Dynamics, 2016, 86, 1493-1534.	2.7	134
17	Where do inertial particles go in fluid flows?. Physica D: Nonlinear Phenomena, 2008, 237, 573-583.	1.3	125
18	Objective Detection of Oceanic Eddies and the Agulhas Leakage. Journal of Physical Oceanography, 2013, 43, 1426-1438.	0.7	124

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19	Forecasting sudden changes in environmental pollution patterns. Proceedings of the National Academy of Sciences of the United States of America, 2012, 109, 4738-4743.	3.3	122
20	Exact theory of three-dimensional flow separation. Part 1. Steady separation. Journal of Fluid Mechanics, 2006, 564, 57.	1.4	120
21	Spectral-clustering approach to Lagrangian vortex detection. Physical Review E, 2016, 93, 063107.	0.8	112
22	Geometry of Cross-Stream Mixing in a Double-Gyre Ocean Model. Journal of Physical Oceanography, 1999, 29, 1649-1665.	0.7	109
23	Lagrangian coherent structures and the smallest finite-time Lyapunov exponent. Chaos, 2011, 21, 023115.	1.0	105
24	Strange eigenmodes and decay of variance in the mixing of diffusive tracers. Physica D: Nonlinear Phenomena, 2004, 188, 1-39.	1.3	104
25	Orbits homoclinic to resonances: The Hamiltonian case. Physica D: Nonlinear Phenomena, 1993, 66, 298-346.	1.3	95
26	Optimal Pollution Mitigation in Monterey Bay Based on Coastal Radar Data and Nonlinear Dynamics. Environmental Science & Technology, 2007, 41, 6562-6572.	4.6	93
27	Drifter motion in the Gulf of Mexico constrained by altimetric Lagrangian coherent structures. Geophysical Research Letters, 2013, 40, 6171-6175.	1.5	90
28	Multi-pulse jumping orbits and homoclinic trees in a modal truncation of the damped-forced nonlinear SchrÃ¶dinger equation. Physica D: Nonlinear Phenomena, 1995, 85, 311-347.	1.3	87
29	LCS Tool: A computational platform for Lagrangian coherent structures. Journal of Computational Science, 2015, 7, 26-36.	1.5	86
30	Inertial Particle Dynamics in a Hurricane. Journals of the Atmospheric Sciences, 2009, 66, 2481-2492.	0.6	82
31	Objective Eulerian coherent structures. Chaos, 2016, 26, 053110.	1.0	69
32	Micro-chaos in digital control. Journal of Nonlinear Science, 1996, 6, 415-448.	1.0	63
33	Transport by Lagrangian Vortices in the Eastern Pacific. Journal of Physical Oceanography, 2018, 48, 667-685.	0.7	63
34	Dissipative inertial transport patterns near coherent Lagrangian eddies in the ocean. Chaos, 2015, 25, 087412.	1.0	62
35	Geometry and chaos near resonant equilibria of 3-DOF Hamiltonian systems. Physica D: Nonlinear Phenomena, 1996, 90, 319-365.	1.3	60
36	Hyperbolic and elliptic transport barriers in three-dimensional unsteady flows. Physica D: Nonlinear Phenomena, 2014, 273-274, 46-62.	1.3	60

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37	Reduction of three-dimensional, volume-preserving flows with symmetry. Nonlinearity, 1998, 11, 319-339.	0.6	53
38	Automated computation of autonomous spectral submanifolds for nonlinear modal analysis. Journal of Sound and Vibration, 2018, 420, 269-295.	2.1	52
39	Data-driven modeling and prediction of non-linearizable dynamics via spectral submanifolds. Nature Communications, 2022, 13, 872.	5.8	50
40	Lagrangian Coherent Structure Analysis of Terminal Winds Detected by Lidar. Part I: Turbulence Structures. Journal of Applied Meteorology and Climatology, 2011, 50, 325-338.	0.6	49
41	Shearless transport barriers in unsteady two-dimensional flows and maps. Physica D: Nonlinear Phenomena, 2014, 278-279, 44-57.	1.3	49
42	Attracting and repelling Lagrangian coherent structures from a single computation. Chaos, 2013, 23, 023101.	1.0	46
43	Material barriers to diffusive and stochastic transport. Proceedings of the National Academy of Sciences of the United States of America, 2018, 115, 9074-9079.	3.3	46
44	How to compute invariant manifolds and their reduced dynamics in high-dimensional finite element models. Nonlinear Dynamics, 2022, 107, 1417-1450.	2.7	45
45	Do Finite-Size Lyapunov Exponents detect coherent structures?. Chaos, 2013, 23, 043126.	1.0	44
46	Exact model reduction by a slowâ€“fast decomposition of nonlinear mechanical systems. Nonlinear Dynamics, 2017, 90, 617-647.	2.7	44
47	Lagrangian Coherent Structures near a Subtropical Jet Stream. Journals of the Atmospheric Sciences, 2010, 67, 2307-2319.	0.6	43
48	Exact nonlinear model reduction for a von KÃ¡rmÃ¡n beam: Slow-fast decomposition and spectral submanifolds. Journal of Sound and Vibration, 2018, 423, 195-211.	2.1	42
49	Dynamic rotation and stretch tensors from a dynamic polar decomposition. Journal of the Mechanics and Physics of Solids, 2016, 86, 70-93.	2.3	41
50	Automated detection of coherent Lagrangian vortices in two-dimensional unsteady flows. Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences, 2015, 471, 20140639.	1.0	38
51	Experimental and numerical investigation of the kinematic theory of unsteady separation. Journal of Fluid Mechanics, 2008, 611, 1-11.	1.4	34
52	The Maxeyâ€“Riley equation: Existence, uniqueness and regularity of solutions. Nonlinear Analysis: Real World Applications, 2015, 22, 98-106.	0.9	34
53	Model reduction to spectral submanifolds and forced-response calculation in high-dimensional mechanical systems. Journal of Sound and Vibration, 2020, 488, 115640.	2.1	33
54	Coherent Lagrangian swirls among submesoscale motions. Proceedings of the National Academy of Sciences of the United States of America, 2019, 116, 18251-18256.	3.3	32

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55	Search and rescue at sea aided by hidden flow structures. Nature Communications, 2020, 11, 2525.	5.8	32
56	An exact theory of three-dimensional fixed separation in unsteady flows. Physics of Fluids, 2008, 20, .	1.6	31
57	Erratum and addendum to â€œA variational theory of hyperbolic Lagrangian coherent structuresâ€• [Physica D 240 (2011) 574â€"598]. Physica D: Nonlinear Phenomena, 2012, 241, 439-441.	1.3	31
58	Reduced-order description of transient instabilities and computation of finite-time Lyapunov exponents. Chaos, 2017, 27, 063103.	1.0	30
59	Explicit backbone curves from spectral submanifolds of forced-damped nonlinear mechanical systems. Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences, 2018, 474, 20180083.	1.0	30
60	Localized Instability and Attraction along Invariant Manifolds. SIAM Journal on Applied Dynamical Systems, 2010, 9, 611-633.	0.7	28
61	Stretching in phase space and applications in general nonautonomous multi-body problems. Celestial Mechanics and Dynamical Astronomy, 2015, 122, 213-238.	0.5	28
62	Nonlinear model identification and spectral submanifolds for multi-degree-of-freedom mechanical vibrations. Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences, 2017, 473, 20160759.	1.0	28
63	Ghost manifolds in slowâ€"fast systems, with applications to unsteady fluid flow separation. Physica D: Nonlinear Phenomena, 2008, 237, 1507-1529.	1.3	26
64	Polar rotation angle identifies elliptic islands in unsteady dynamical systems. Physica D: Nonlinear Phenomena, 2016, 315, 1-12.	1.3	26
65	Extraction of Separation and Attachment Surfaces from Three-Dimensional Steady Shear Flows. AIAA Journal, 2007, 45, 1290-1302.	1.5	24
66	Geodesic Transport Barriers in Jupiter's Atmosphere: A Video-Based Analysis. SIAM Review, 2016, 58, 69-89.	4.2	24
67	Diffusion at intersecting resonances in Hamiltonian systems. Physics Letters, Section A: General, Atomic and Solid State Physics, 1995, 200, 34-42.	0.9	23
68	Multi-Dimensional Homoclinic Jumping and the Discretized NLS Equation. Communications in Mathematical Physics, 1998, 193, 1-46.	1.0	23
69	Analytic prediction of isolated forced response curves from spectral submanifolds. Nonlinear Dynamics, 2019, 98, 2755-2773.	2.7	23
70	Neutrally buoyant particle dynamics in fluid flows: Comparison of experiments with Lagrangian stochastic models. Physics of Fluids, 2011, 23, .	1.6	22
71	Machine-Learning Mesoscale and Submesoscale Surface Dynamics from Lagrangian Ocean Drifter Trajectories. Journal of Physical Oceanography, 2020, 50, 1179-1196.	0.7	22
72	Uncovering the Edge of the Polar Vortex. Journals of the Atmospheric Sciences, 2017, 74, 3871-3885.	0.6	21

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73	Transition states near rank-two saddles: Correlated electron dynamics of helium. Communications in Nonlinear Science and Numerical Simulation, 2010, 15, 48-59.	1.7	20
74	Instabilities on Prey Dynamics in Jellyfish Feeding. Bulletin of Mathematical Biology, 2011, 73, 1841-1856.	0.9	20
75	Transition state geometry near higher-rank saddles in phase space. Nonlinearity, 2011, 24, 527-561.	0.6	20
76	Explicit third-order model reduction formulas for general nonlinear mechanical systems. Journal of Sound and Vibration, 2020, 468, 115039.	2.1	19
77	Universal homoclinic bifurcations and chaos near double resonances. Journal of Statistical Physics, 1997, 86, 1011-1051.	0.5	18
78	Lagrangian coherent structures and entrainment near the turbulent/non-turbulent interface of a gravity current. Journal of Fluid Mechanics, 2019, 877, 824-843.	1.4	18
79	How do conservative backbone curves perturb into forced responses? A Melnikov function analysis. Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences, 2020, 476, 20190494.	1.0	18
80	Asymptotic Dynamics of Inertial Particles with Memory. Journal of Nonlinear Science, 2015, 25, 1225-1255.	1.0	17
81	Solving the inertial particle equation with memory. Journal of Fluid Mechanics, 2019, 874, 1-4.	1.4	17
82	Connecting the time evolution of the turbulence interface to coherent structures. Journal of Fluid Mechanics, 2020, 898, .	1.4	17
83	Detecting invariant manifolds, attractors, and generalized KAM tori in aperiodically forced mechanical systems. Nonlinear Dynamics, 2013, 73, 689-704.	2.7	16
84	Invisible Anchors Trap Particles in Branching Junctions. Physical Review Letters, 2018, 121, 054502.	2.9	16
85	Fast computation of steady-state response for high-degree-of-freedom nonlinear systems. Nonlinear Dynamics, 2019, 97, 313-341.	2.7	16
86	Gyroscopic stability and its loss in systems with two essential coordinates. International Journal of Non-Linear Mechanics, 1992, 27, 113-127.	1.4	15
87	Predicting transport by Lagrangian coherent structures with a high-order method. Theoretical and Computational Fluid Dynamics, 2006, 21, 39-58.	0.9	15
88	Objective barriers to the transport of dynamically active vector fields. Journal of Fluid Mechanics, 2020, 905, .	1.4	15
89	Global dynamics of an autoparametric springâ€“massâ€“pendulum system. Nonlinear Dynamics, 2007, 49, 105-116.	2.7	14
90	Detecting invariant manifolds as stationary Lagrangian coherent structures in autonomous dynamical systems. Chaos, 2013, 23, 043107.	1.0	14

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91	Efficient computation of null geodesics with applications to coherent vortex detection. Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences, 2017, 473, 20160807.	1.0	14
92	Barriers to the Transport of Diffusive Scalars in Compressible Flows. SIAM Journal on Applied Dynamical Systems, 2020, 19, 85-123.	0.7	14
93	Can vortex criteria be objectivized?. Journal of Fluid Mechanics, 2021, 908, .	1.4	14
94	Nonlinear analysis of forced mechanical systems with internal resonance using spectral submanifolds, Part II: Bifurcation and quasi-periodic response. Nonlinear Dynamics, 2022, 110, 1045-1080.	2.7	14
95	Data-driven nonlinear model reduction to spectral submanifolds in mechanical systems. Philosophical Transactions Series A, Mathematical, Physical, and Engineering Sciences, 2022, 380, .	1.6	14
96	Forecasting long-lived Lagrangian vortices from their objective Eulerian footprints. Journal of Fluid Mechanics, 2017, 813, 436-457.	1.4	13
97	Åilnikov manifolds in coupled nonlinear SchrÃ¶dinger equations. Physics Letters, Section A: General, Atomic and Solid State Physics, 1999, 263, 175-185.	0.9	12
98	Unsteady flow separation on slip boundaries. Physics of Fluids, 2008, 20, .	1.6	12
99	Locating an atmospheric contamination source using slow manifolds. Physics of Fluids, 2009, 21, 043302.	1.6	12
100	Rigorous Model Reduction for a Damped-Forced Nonlinear Beam Model: An Infinite-Dimensional Analysis. Journal of Nonlinear Science, 2018, 28, 1109-1150.	1.0	12
101	Explicit unsteady Navierâ€"Stokes solutions and their analysis via local vortex criteria. Physics of Fluids, 2020, 32, .	1.6	12
102	Eddy growth and mixing in mesoscale oceanographic flows. Nonlinear Processes in Geophysics, 1997, 4, 223-235.	0.6	11
103	Infinite Dimensional Geometric Singular Perturbation Theory for the Maxwell--Bloch Equations. SIAM Journal on Mathematical Analysis, 2001, 33, 315-346.	0.9	11
104	Quasi-objective coherent structure diagnostics from single trajectories. Chaos, 2021, 31, 043131.	1.0	11
105	Vortex boundaries as barriers to diffusive vorticity transport in two-dimensional flows. Physical Review Fluids, 2020, 5, .	1.0	11
106	Level set formulation of two-dimensional Lagrangian vortex detection methods. Chaos, 2016, 26, 103102.	1.0	10
107	Using spectral submanifolds for optimal mode selection in nonlinear model reduction. Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences, 2021, 477, 20200725.	1.0	10
108	Attraction-based computation of hyperbolic Lagrangian coherent structures. Journal of Computational Dynamics, 2015, 2, 83-93.	0.4	10

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109	Global variational approach to elliptic transport barriers in three dimensions. Chaos, 2016, 26, 033114.	1.0	8
110	Exact theory of material spike formation in flow separation. Journal of Fluid Mechanics, 2018, 845, 51-92.	1.4	8
111	Metal-catalyst-free gas-phase synthesis of long-chain hydrocarbons. Nature Communications, 2021, 12, 5937.	5.8	7
112	Stability of forcedâ€"damped response in mechanical systems from a Melnikov analysis. Chaos, 2020, 30, 083103.	1.0	6
113	Objective momentum barriers in wall turbulence. Journal of Fluid Mechanics, 2022, 941, .	1.4	6
114	Lagrangian Detection of Wind Shear for Landing Aircraft. Journal of Atmospheric and Oceanic Technology, 2013, 30, 2808-2819.	0.5	5
115	When does a periodic response exist in a periodically forced multi-degree-of-freedom mechanical system?. Nonlinear Dynamics, 2019, 98, 1761-1780.	2.7	5
116	Universal upper estimate for prediction errors under moderate model uncertainty. Chaos, 2020, 30, 113144.	1.0	4
117	Material spike formation in highly unsteady separated flows. Journal of Fluid Mechanics, 2020, 883, .	1.4	3
118	Harnessing stratospheric diffusion barriers for enhanced climate geoengineering. Atmospheric Chemistry and Physics, 2021, 21, 8845-8861.	1.9	3
119	Analytic reconstruction of a two-dimensional velocity field from an observed diffusive scalar. Journal of Fluid Mechanics, 2019, 871, 755-774.	1.4	2
120	Integral equations and model reduction for fast computation of nonlinear periodic response. International Journal for Numerical Methods in Engineering, 2021, 122, 4637-4659.	1.5	2
121	Inertial manifolds and completeness of eigenmodes for unsteady magnetic dynamos. Physica D: Nonlinear Phenomena, 2004, 194, 297-297.	1.3	1
122	Reduced Navierâ€"Stokes equations near a flow boundary. Physica D: Nonlinear Phenomena, 2006, 217, 161-185.	1.3	1
123	Clustering of Inertial Particles in 3D Steady Flows. , 2010, , .		0
124	Mixing, Transport and Coherent Structures. Oberwolfach Reports, 2014, 11, 213-286.	0.0	0
125	Preface: Dynamics of ocean waves and currents. Deep-Sea Research Part II: Topical Studies in Oceanography, 2019, 160, 1-2.	0.6	0
126	Connecting the time evolution of the turbulence interface to coherent structures â€" CORRIGENDUM. Journal of Fluid Mechanics, 2020, 899, .	1.4	0

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127	Launching the Feature Article series. Nonlinear Dynamics, 2020, 102, 1963-1963.	2.7	0
128	Time-varying Spectral Submanifolds: Analytic Calculation of Backbone Curves and Forced Response. Conference Proceedings of the Society for Experimental Mechanics, 2019, , 141-142.	0.3	0
129	The Relevance of Nonlinear Normal Modes for Randomly Excited Nonlinear Mechanical Systems. Conference Proceedings of the Society for Experimental Mechanics, 2021, , 223-225.	0.3	0
130	Experimental Spectral Submanifold Reduced Order Models from Machine Learning. Conference Proceedings of the Society for Experimental Mechanics, 2021, , 249-251.	0.3	0
131	Establishing the Exact Relation Between Conservative Backbone Curves and Frequency Responses via Energy Balance. Conference Proceedings of the Society for Experimental Mechanics, 2022, , 189-192.	0.3	0
132	The deterministic core of stochastically perturbed nonlinear mechanical systems. Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences, 2022, 478, .	1.0	0